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ABSTRACT: Since 1947, when FAO began its involvement in vertebrate pest problems, its role has gradually expanded. Through short-term Consultants, Experts, Regional and Headquarters Officers, it advises Member Countries about vertebrate pest control needs and opportunities, fulfills requests for assistance suggesting needed modifications, and guides and reports on assistance rendered. Assistance may involve one or more international specialists for a few weeks up to national and regional projects of several years' duration. In cooperation with WHO it sponsors meetings of specialists, develops rodenticide specifications for international commerce, and has published rodent bibliographies covering 1950 to 1969.

The Food and Agriculture Organization of the United Nations (FAO), among other activities, is charged by its Member Countries with the objective of assisting in "securing improvements in the efficiency of production and distribution of all food and agricultural products" (FAO, 1968). Two of the avenues of efforts by which the Organization seeks to fulfill this aim are: 1) to upgrade and increase directly the production of crops and animals and the effective distribution of the resulting products; and 2) to prevent losses in this production due to such causes as pests which attack before and after harvest.

Vertebrate pest problems come into FAO's purview, of course, in this latter work and available records indicate the first notable effort was to provide information to member Governments on rodent control principles (Barnett, 1948). This was done through an international conference on grain preservation organized principally by the late Dr. S. S. Easter just 4 years after FAO's Founding Conference at Hot Springs, Arkansas.

FIELD PROJECT ACTIVITIES

Most people think of the work conducted directly for one or another of the developing nations as the role of FAO. Indeed, FAO provides some requested assistance directly, and the first instance involving vertebrates was to help solve and prevent recurrence of the Cotobato, Philippines rat plague (Clark, 1958). With funds provided by the United Nations Development Programme (UNDP) somewhat similar work was guided later in Panama (Spencer, 1968); this might be termed an "action" programme. More recently, in the case of an African country's request for assistance with a rodent outbreak in its principal agricultural area, after a season of serious losses the problem subsided and this occurred before a source of adequate funds could be found. Using the example of the organizational and financing structure of the inter-regional desert locust control programme and its provisions for emergencies like this, plans are being discussed which should prevent such an unfortunate situation recurring.

To provide recommendations for amelioration of annually recurring or gradually increasing problems which trouble nations, FAO has furnished Consultants and the needed funds (Bentley, 1968; Shuyler, 1970). The results of such an investigation may help in the formulation of a project request for more substantial assistance, such as resulted in the FAO/UNDP Vertebrate Pest Control Centre now in the early stage of operation in Karachi, Pakistan. Mr. H. A. Merrill, now retired from USDI, attended the most recent of these Vertebrate Pest Control Conferences as a follow-up to his short Consultancy for this project which was interrupted by Pakistan's difficulties with India. Two international Experts are assigned to this project now and a third, Dr. G. W. Fulk, is expected shortly. He will continue the mammalogy work initiated by Dr. D. W. Walton. Using this project as an example, a very significant quantity and variety of specialized equipment and supplies are furnished through FAO in most of its assistance. It is anticipated that "transfer of knowledge", together with any necessary modifications, and training will be the primary inputs for rodent control in central grain stores. But careful investigations of the biology and ecology of the rodents are considered necessary to establish rodent management programmes for most other problem situations in Pakistan. Training of extension personnel then becomes important. Though the emphasis is on rodents, control of other pest mammals and birds also is to be investigated.

FAO's assistance with UNDP funding may deal solely with continuing vertebrate pest problems, as in the case of the Consultant who investigated and made recommendations for management of the weaver bird introduced a century ago into the island of Hispaniola (Fitzwater, 1972). Or, the guidance may be within the context of more general FAO assistance in plant protection. For example, Dr. W. E. Howard, a founder of these Conferences, is expected to depart soon for Korea to assist for a few months in rodent control problems, including those of forests, as a part of an ongoing team of plant protection specialists. As a result of some of these projects, comprehensive plant protection manuals are developed which include information on vertebrate pest control problems (e.g., Ratanaworabhan and Shuyler, 1971). As a part of a project to improve sheep husbandry in Argentina, consultancies were required to consider the problem of rabbit management on the ranges (Howard, 1969).

As we discuss benefits to be derived by the Member Nations through the work of international specialists, we must not forget there is "another side to the coin", so to speak. International Fellowships through FAO for budding specialists of a developing country to study in another country are granted in many ways and are a feature of most of the larger FAO projects. For example, the Korean counterpart with whom Dr. Howard is expected to work most closely has received, through the project at Seoul for "Strengthening the Plant Protection Services," training in vertebrate pest problems at the Smithsonian Institute, Washington D. C; the Wildlife Research Center (DWRC), USDI, Denver, Colorado; the University of California, Davis; and the USAID-assisted Rodent Research Center, Los Banõs, Philippines.

FAO projects of broader scope may not have specific funding but find a need for assistance with vertebrate pest problems. These projects may aid the country through the use of Associate Experts or International Volunteers. A Peace Corps Volunteer (USPCV), for example, has been studying rodent problems for 2 years in an area of Ethiopia as a part of the team of the FAO/UNDP project entitled "Institute of Agricultural Research." With an economic entomologist for general guidance, this USPCV (as well as the Project and the Member Nation) has also had the help of Dr. W. B. Jackson, Bowling Green State University, Bowling Green, Ohio, as a short-term Consultant provided by the project's funds (Jackson, 1973). Sometimes professionals on assignment must concern themselves with very specialized subjects, e.g., damages to underground stores by the naked mole rat, Heterocephalus glaber (Watt, 1971). In some assignments, astute observational abilities may be as important as prior expertise. In one such instance, the maize (corn) stored on the cob in one region of Ghana was observed to suffer much less rodent damage than elsewhere simply because of the method used in stacking the ears in the crib (Rawnsley, 1969). Reduction in vertebrate pest problems may result from work to alleviate other pest losses (Pattinson, 1970).

FAO also provides assistance in vertebrate pest problems in response to mutual requests of three or more nations of a region. An example of this, with which many are acquainted, is the FAO/UNDP Regional project for control of grain-eating birds in Africa, in which 12 nations of the sub-Sahara are participating. [Because of the spectacular flocks of and depredations by the region's red-billed weaver, Quelea quelea, this project is often referred to as the "Quelea (bird) project."] This very large project, beginning its second phase with 5 of the 9 international specialists (among them Dr. J. J. Jackson) and plans for 2 Associate Experts, requires systematic research to establish an ecological basis for management of the complex, multi-species, pest-bird problems of the region. Mr. J. F. Besser and Dr. J. W. De Grazio, DWRC, have contributed to this work, centered in Chad. A manual of the necessary investigatory procedures has been developed (Ward, 1973). Two of the Fellows of this project have studied internationally at Cornell University, Ithaca, New York, and with USDI's vertebrate pest management specialists in the field, e.g., Mr. M. Caroline in Texas, in addition to institutions among those noted above. Successful management of these pest birds will contribute to efforts currently being made by FAO and many donor groups to mitigate the overall effects of future droughts such as those which produced the present emergency in the Sudanian/Sahelian zones and in parts of Ethiopia.

In Asia and the Far East, several nations see the potential benefits of regionally coordinated development of vertebrate pest control. At their request and to this end, an ad-hoc FAO-sponsored meeting was held in 1973 at that region's FAO offices in Bangkok, Thailand, to analyze the current situation and develop recommendations (FAO, 1973b).

In the planning, operation and guidance of field projects FAO and other UN organizations cooperate. For example, a medical zoologist to be recruited and technically supervised by the World Health Organization (WHO) is a part of the international staff for the Pakistan Vertebrate Pest Control Centre, due to the interrelationships of rodents with human diseases such as plague (Whittemore, 1973).

Before we leave this subject, it should be noted that two additional benefits are derived from development work such as field projects. One is in scientific benefits. The international specialist gains wider experience so as to do a better job in his home country or other international assignments. The second is in public information benefits. The specialist with international experience potentially becomes an "ambassador" to his students, colleagues and/or acquaintances as to the continuing need of and opportunities for assistance to developing countries.

SPECIAL TRAINING ACTIVITIES

Training courses and seminars not associated directly with field projects are another important technique by which development is assisted by FAO. Among the more recent ones dealing with vertebrate pests, the training seminar on the control of rodents of agricultural and public health importance for Asia and the Far East was sponsored jointly by FAO/WHO (FAO, 1971). In July-August of this year, vertebrate pest problems and their control will be included in the topics of the 6-week storage pest control training course at Dar-es-Salaam, Tanzania, for the five English-speaking countries of East Africa. This FAO/Government Programme effort is financed through a trust fund established by the Swedish International Development Agency (SIDA) which pays the travel costs of the participants, among other expenses. Arrangements are to be made shortly in Central America to establish in 1975 another of these sub-regional crop storage pest control courses in which vertebrate pest problems will be one of the subjects. In this instance, the course is expected to be an FAO/FFHC-AD (Freedom from Hunger Campaign-Aid for Development) Programme effort in which a non-governmental FFHC National Committee or equivalent will establish the trust fund for the financing. Such courses have been similarly funded before (Pattinson, 1968).

At still another level, supervisors of plant protection of the 25 English-speaking countries will receive training which will include vertebrate pest management at Nairobi, Kenya, in July 1974 in the first of a series to be held in different locations for such persons throughout Africa and the Near East. This is an inter-regional FAO/UNDP activity.

The World Food Programme (WFP) is a UN agency, in which the United Nations Organization (UNO) and FAO share participation. In October/November 1974 a refresher training course in Rome is planned for the WFP Officers in the field supervising projects in North Africa and the Near East. It is expected to be under the general direction of Mr. W. H. Andrews, Tropical Stored Products Centre, Overseas Development Administration (ODA), Slough, United Kingdom, and FAO will contribute lectures on the handling of vertebrate pest problems, among other subject matter. This training supplements not only their earlier training but their manual on handling and use of stored products (TSPC, 1970).

A series of seminars, at national and regional level, has included information on vertebrate pest management agents as a small part of the consideration of the safe and effective use of pesticides. Together with important inputs from WHO, the regional seminars have been sponsored jointly by the Plant Production and Protection Division of FAO and the FAO/ Industry Cooperative Programme (ICP) (Adam, 1972 and 1974). This voluntary assistance to agricultural development is one in which many medium-sized and large corporations participate, particularly those headquartered in Europe. More corporations from areas such as North America have begun participating in this FAO/ICP endeavor in recent years, and still more are urged to give consideration to this important means of contributing to development, which in turn leads to a broader base for corporate profits.

OTHER ACTIVITIES

Examination of the special training and field project activities together with that of the Member Governments shows many gaps which FAO is obliged to try to fill to develop a well-rounded approach to vertebrate pest problems. For example, the pertinent literature on rodent pest biology and control is voluminous, widely scattered, without a focal point and not easily accessible. The newly published FAO/WHO bibliographies on this subject covering the years 1950-1969 are intended as a significant contribution for research and control workers of both the developing and the more developed Member Countries. It is planned to continue to update these bibliographies to the extent that funds are available.

The individuals dealing with vertebrate pest problems at FAO Regional Offices and Headquarters are a focal point for communications dealing with technical subjects and endeavor to stimulate, modify, guide and evaluate the various activities undertaken on behalf of the developing and more developed Member Nations. The literature, such as referenced in the

bibliographies, and contacts with vertebrate pest workers from various areas of the world, including those in the International Biological Programme (IBP), make it ever more apparent that FAO (and WHO) need guidance in re-evaluating their priorities and practical goals with regard to development needs. Indeed, the FAO Plant Protection Service is undergoing a thorough programme review in the light of the progressively rapid changes in such areas as the international monetary situation, availability and cost of pesticides and related agricultural inputs, high prices of food commodities, apparent reluctance of donors to increase international assistance, and the nature of assistance requested. To these ends an FAO/WHO meeting of specialists in various aspects of vertebrate pest problems from several areas is being planned for 1975 (FAO, 1973). (WHO recently held a meeting of a group on the ecology and control of rodents of public health importance in which FAO participated by invitation.) In recognition of the need for such a review, a simplified statement of the current FAO viewpoint of the rodent portion of these vertebrate pest problems has been attempted, in order to have a baseline for the needed discussions (Shuyler, 1972 and 1972a).

One of the obvious needs which come to the forefront in work in developing countries, but for which the needs are just as great in the more developed ones, is to have the tools by which vertebrate pest losses can be assessed and then make appropriate assessments. One method, for assessing rodent losses in sugar cane, has been accepted and published by FAO (FAO, 1970a). Two other methods for assessing rodent losses are under review. The specialists in the African Quelea project and the Pakistan vertebrate pest control project are endeavoring to do some of this work. Another approach to loss estimates, on which the report has not yet been made, is the worldwide survey of rodent losses (PANS, 1972) being conducted by Dr. H. Hopf, Centre for Overseas Pest Research (COPR), ODA, London, UK, with the cooperation of FAO and WHO. The needed characteristics of methods for quantification of vertebrate losses in storage, intermediate in probable precision and cost between the first and last mentioned approaches, were studied briefly in a seminar conducted by the informal Group for Assistance on Storage of Grains in Africa (GASGA) (of which FAO is a member) dealing primarily with losses in farm/village storage (TSPI, 1973).

Another opportunity will be offered to study storage loss methods, including those due to vertebrate pests, as an FAO/WHO survey on crop storage losses is conducted in the Near East in 1975 (FAO, 1973).

FAO's involvement in plant quarantine activities through the International Plant Protection Convention of 1952 is long established. A gap exists in the protection rendered possible by this convention. No provision is included in this international "law" to control international transfer, accidental or otherwise, of vertebrate pests of agriculture (where there is no known public health threat). To stimulate discussion on the subject, a paper was presented to the 1971 meeting of the Caribbean Plant Protection Commission (FAO, 1973a).

FAO has international commerce specifications at various stages of development by its Working Party of Experts on Official Control of Pesticides (Group B. Specifications) for some of the vertebrate pest control agents used in agriculture and WHO and USAID are cooperating with FAO in this effort (FAO, 1971). (For many rodenticides used in public health, WHO has specifications which FAO considers "the guide" unless agriculture has special needs.) Published guides are available to help in establishing national programmes for control of vertebrate and other pesticides (FAO, 1970; FAO/WHO, 1969). FAO is kept abreast of developments in vertebrate pest resistance (rodents to date) and is guided on future action by its Working Party of Experts on Resistance to Pesticides (FAO, 1970b). Due to usage elsewhere in plant protection a few of the vertebrate pest control agents have been evaluated with respect to pesticide levels in food (FAO/WHO, 1972). Safe, efficient use of equipment for pest control is of concern to FAO (Akesson and Yates, 1972) and controversy over that used in connection with vertebrate pest problems and involved in international commerce would result in an addition to the "agenda".

The success of the International Agricultural Research Centers and their networks of collaborating institutions requires the examination of these techniques as to their utility in vertebrate pest problems. At first, the diversity in species and ecology seems to defy the use of this approach. Consideration is being given, however, to the possible formation of such a global network coordinated by FAO for attack on the problems of grain-eating birds, possibly preceded by a conference on the subject. The unity of approach to and validity of findings on this subject in the IBP certainly indicates a need for study of this approach.

In addition to the regional approach in Asia and the Far East, proposals are being considered for an inter-regional approach to the problems of rodents damaging crops in semi-arid lands which would begin in two to four countries in Asia and Africa. FAO would be supervising a smaller network in this instance.

Today, mostly informal networks exist. These function reasonably well encouraging an exchange of information, and international contributions are being made by various of the personnel in many ways. A contractual link exists between the Quelea project and the Organisation Commune de Lutte Antiacridienne et Antiaviare (OCLALAV) which has proven valuable. Among the informal "network" institutions not yet mentioned, the Pest Infestation Control Laboratory (PICL), Ministry of Agriculture, Food and Fisheries, UK, is in the forefront. PICL's Mr. D. C. Drummond, initiated the Pakistan project excellently during the time of that country's problems with India, and its Mr. J. W. Greaves, Vertebrate Pest Control Specialist, is there now. Cooperation between FAO and the Federal Republic of Germany/ Philippines field rodent control project has proved mutually fruitful. Another informal contribution to these "links" which should be encouraged is exemplified by the consideration being given currently to a professor spending his sabbatical on assignment with an FAO project involving himself with aspects of the vertebrate pest problems.

Even as FAO began its role in vertebrate pest problems by furnishing information to its Member Countries through a publication, these efforts continue today. Among recent publications which deal with vertebrate pests are one on coconut palm problems (Lever, 1969) and a fumigation manual now in its third English printing of the second edition (Monro, 1969). From time to time articles pertaining to vertebrate pest problems appear in FAO's periodicals such as the International Rice Commission Newsletter (Shuyler and Ratanaworabhan, 1970), the FAO Plant Protection Bulletin (Fernando, et al., 1969) and the FAO Nutrition Newsletter (den Hartog and de Vos, 1973).

It is hoped this brief review of FAO activities concerned with vertebrate pests will encourage more people to consider ways in which they can contribute to development, even through suggestions resulting from questions raised by this presentation. While assisting development, one can also contribute to science, personal career development and job satisfaction. Though not an FAO activity, the work described in the paper entitled "Trapping: A Continuous Integral Part of a Rodent Control Programme" presented at this conference is intended as an example of the kinds of scientific opportunities which abound in international work. Hopefully, it also typifies the many small ways in which, through added national expertise, agricultural losses due to vertebrate pests can be reduced while at the same time infinitesimally increasing productive employment; these, in turn, add to the national income and widen its distribution. All of these are within the realm of FAO's goals.

LITERATURE CITED

ADAM, A. V. 1972. Summary of joint FAO/ Industry Seminar on the safe, effective and efficient utilization of pesticides in agriculture and public health in Central America and the Caribbean (TF:LAT/l6) Turrialba, Costa Rica, 20-28 April 1972. Rome. FAO ACPP:MISC/6. 25 pp.

_____1974. Report of FAO/ICP Seminar on the safe, effective and efficient utilization of pesticides in agriculture and public health in Asia and the Far East, Bangkok, Thailand, 3-12 September 1973. Rome. FAO AGPP:MISC/74/12. 25 pp.

AKESSON, N. B. and YATES, W. E. 1972. The use of aircraft in agriculture. Rome. FAO AGS:ASB/16. 166 pp.

BARNETT, S. A. 1948. Principles of rodent control, pp. l29-l48. In Preservation of grains in storage. Rome. FAO Agr. Studies No. 2. 174 pp.

BENTLEY, E. W. 1968. The control of rodents in Pakistan. Rome. FAO No. PL:CP/23/RP. 15 pp.

CLARK, R. J. 1958. The control of field rats in Mindanao. Rpt. to Govt. of Phils. Rome. FAO No. Proj. PHI/AGP 785. 29 pp.

DEN HARTOG, A. P., and DE VOS, A. 1973. The use of rodents as food in tropical Africa. FAO Nutr. Newsl. 11 (2) : 1-14.

FAO. 1968. Constitution (of FAO). pp. 7-26. In Basic texts. Vol 1. Rome. FAO. 176 pp.

1970. A model scheme for the establishment of national organizations for the official control of pesticides. Rome. FAO AGP:CP 28. 75 pp.

_____1970a. Crop loss assessment methods. Rome. FAO AGP:CP/22. 4.4.5/1 pp. (decimal pagination)

_____1970b. Pest resistance to pesticides in agriculture. Rome. FAO AGP:CP/26. 32 pp.

FAO. 1971. Manual on the use of FAO specifications for plant protection products. Rome. FAO Agric. Devt. Paper No. 93. 46 pp.

_____ 1971a. Report on the FAO/WHO Regional Training Seminar on the control of rodents of agricultural and public health importance, Manila, Philippines, 8-18 December 1969. Rome. FAO No. TA 2940. 45 pp.

1973. Prevention and control of post-harvest losses, pp. 246-248. In The Director-General's programme of work and budget for 1974-75. Rome. FAO C 73/3. 402 pp.

_____ 1973a. Report of the Third Session of the Caribbean Plant Protection Commission, St. Johns, Antigua, 14-21 August 1972. Rome. FAO AGP/1973/M/1. 28 pp.

1973b. Vertebrate pest management in Asia and the Far East. Rpt. of Ad-Hoc Panel, 20-27 September 1973, Bangkok, Thailand, Bangkok. FAO No. RAFE 14. 36 pp.

FAO/WHO. 1969. Guidelines for legislation concerning the registration for sale and marketing of pesticides. Rome. FAO PL:CP/21; WHO OH/69.3. 11 pp.

1972. 1971 evaluations of some pesticide residues in food. FAO/AGP/1971/M/9/1; WHO Pestic. Resid. Ser. No. 1. 345 pp.

FERNANDO, H. E., KAWAMOTO, N., and PERERA, N. 1967. The biology and control of the rice field mole rat of Ceylon, Gunomys gracilis. FAO PI. Prot. Bull. 15(2):32-39.

FITZWATER, W. D. 1972. [Controlling weaver finch problems in Hispaniola.] (In French and Spanish). Rome. FAO No. AT 3104. 16 pp.

HOWARD, W. E. 1969. Report of wildlife section, sheep husbandry research project, Argentina. 22 pp.

JACKSON, W. B. 1973. An investigational framework to assist research and management of rodent populations in Ethiopia. Addis Ababa. Inst. Agr. Res. 38 pp.

LEVER, R. J. A. W. 1969. Vertebrate pests, pp. 146-151. In Pests of the coconut palm. Rome. FAO Agr. Studies No. 77. 190 pp.

MONRO, H. A. U. 1969. Fumigation for controlling rodents and other mammalian pests, snakes, birds, snails, ants' nests, wasps and termites, pp. 333-334. In Manual of fumigation for insect contro. Rome. FAO Agr. Studies No. 79. 381 pp.

PANS. 1972. Survey of rodent damage to growing crops and in farm and village storage. PANS 18(2):247.

PATTINSON, I. 1968. National Training Course in grain storage and infestation control. Rpt. to Govt. of Ghana. Rome. FAO Rpt. No. 36 PL:CP/24. 10 pp.

1970. War on waste: Grain storage at village level, Tanzania. Rome. FAO/FFHC No. FH/TAN 11. 8 pp.

RATANAWORABHAN, SAWART and SHUYLER, H. R. 1971. Animal pests, pp. 68-71, 133-134. In Rice diseases and pests of Thailand. Bangkok. Rice Prot. Res. Ctr., Rice Dept., Min. Agr., Thailand. Engl. ed. 136 pp.

RAWNSLEY, J. 1969. Crop Storage. Rpt. Food Res. and Devt. Unit, Accra, to Govt. of Ghana. Rome. FAO No. PL:SF/GHA 7, Tech. Rpt. 1. 89 pp.

SHUYLER, H. R. 1970. Control of rodents and grain-eating birds. Rpt. to Govt. of United Arab Rep. Rome. FAO No. RP 7 AGP:RT 5/70. 15 pp.

_____ 1972. Rodent control in the tropics. Meded. Landbouw-wet.-sch. (Ghent) 37(2): 416-423.

1972a. Rodents in the tropics: Their effects and control. PANS 18 (4) :445-451 .

and RATANAWORABHAN, SAWART. 1970. Rodents as pests of rice in Thailand. Intl. Rice Commn. Newsl. 19 (2):20-24.

SPENCER, H. J. 1968. [Rodent control. Rpt. to Govt. of Panama.] (In Spanish). Rome. FAO No. AT 2492. 11 pp.

TSPC (Tropical Stored Products Centre, TPI, 0DA, UK) 1970. Food Storage Manual. 3 parts. Rome. Wld. Food Prog. 799 pp.

TSPI. 1973. Group for assistance on Storage of Grains in Africa Seminar on the methodology of evaluating grain storage losses, TPI, London, 6-7 February 1973. Trop. Stor. Prod. Info. 24:13-16; and (in French) Agr. Trop. 1973(5).

WARD, P. 1973. Manual of techniques used in research on Quelea birds. Rome. FAO AGP:RAF/67/087. 53 PP.

WATT, M. J. 1971. Grain storage and crop protection. Grain marketing, storage and price stabilization. Rpt. to Govt. of Somalia. Rome. FAO ESR:SF/S0M 7. Tech. Rpt. No. 1. 47 pp.

WHITTEMORE, F. W. 1973. Past, present and future FAO/WHO cooperative programmes related to plant pest control. FAO Pl. Prot. Bull. 21(l):l4-17.